

THURSDAY, AUGUST 4, 1881

FOSSIL CRINOIDS

Mémoires de la Société Paléontologique Suisse. Monographie des Crinoïdes Fossiles de la Suisse. Par P. de Loriol. (Genève: Imprimerie Charles Schuchardt, 1877-1879.)

Iconographia Crinoideorum in Stratis Sueciæ Siluricis Fossilium. Auctore N. P. Angelin, Opus postumum edendum curavit Regia Academia Scientiarum Suecica. Cum Tabulis XXIX. (Holmiæ: Samson et Wallin, 1878.)

PROF. P. DE LORIOLOf Geneva, who is so well known for his researches on the fossil sea-urchins, has been occupying himself for some time past with the study of the fossil Crinoids. A handsome volume, consisting of 300 pages of text and twenty-one somewhat crowded quarto plates, contains the results of his work on those discovered in the stratified rocks of Switzerland. It originally appeared in three parts, which formed portions of the volumes issued by the Palæontological Society of Switzerland for the years 1877-79.

The total number of species described by Prof. de Loriol amounts to 125, of which thirty-nine are new to science. The series commences with the well-known "Lily-Encrinite" from the Muschelkalk, and ends with a species of D'Orbigny's doubtful genus "*Conocrinus*" from the Nummulitic Eocene of Wesen. Palæozoic Crinoids are, of course, conspicuous by their absence; so that Prof. de Loriol was not hampered by having to deal with any obsolete system of classification. For the primary divisions of the class he adopts Dujardin's modification of Pictet's system. This throws such very diverse forms as *Encrinus*, *Apiocrinus*, and *Pentacrinus* into one family, the *Pycnocrinides*, which is especially characterised by the thickness of the plates of the calyx.

Each of these genera, however, is best regarded as the type of a separate family. In fact, Pictet's "family" of *Pycnocrinides* includes nearly all the non-palæozoic Crinoids or Neocrinoidea except the *Comatulæ*, and is far more comprehensive than an ordinary zoological "family."

Encrinus and *Apiocrinus* are fairly well represented in the Jurassic rocks of Switzerland. Two species of the former genus are described by Prof. de Loriol, one of which is new; and there are four species of *Apiocrinus*, one of which is new, though founded only on the characters of the stem. *Millericrinus* and *Pentacrinus*, however, are considerably more abundant. Thirty-three species of the former are described, two being Liassic and three Cretaceous; while there are no less than forty-three *Pentacrinus* species, six of which are Cretaceous, and one from the Infra-Lias (Rhætic).

Most of the species are necessarily founded only on the characters of isolated joints and fragments of stems, and are therefore only of provisional value; for two or more joints, the markings on which differ considerably, may really belong to different parts of the same stem. Nevertheless, after making allowance for these possibilities, Prof. de Loriol finds a considerable number of different types of stem which are confined to particular horizons.

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They thus acquire some stratigraphical value, and it is convenient to name them, but the names can only acquire a permanent value (or otherwise) when we are acquainted with the calices associated with the stem-joints in question. This is, unfortunately, but far too rarely possible.

The genus "*Pentacrinus*" is a large one, and it is almost necessary to separate off some of the best marked varieties as distinct generic types, just as has been done with *Apiocrinus*. Prof. de Loriol has attempted this subdivision in two cases, in one of which he seems to us to be fully justified, though we cannot say the same for the other. He attempts to re-establish the genus *Cainocrinus* of Edward Forbes, to include those species of *Pentacrinus* in which the basals form a complete ring and cut off the radials entirely from the top stem-joint. The characters of the stem and of the faces of its component joints are identical with those of the ordinary *Pentacrinus* type; and there is so much variation in the development of the basals among the different *Pentacrinus* species, both recent and fossil, that it is hardly worth while to separate off one of the extreme terms of the series as a distinct genus. Besides the fossil species mentioned by Prof. de Loriol *Cainocrinus* would include the recent *Pentacrinus Müller*i, Oersted, from the Caribbean Sea, *P. Wyville-Thomson*i from the North Atlantic, and *P. Maclearanus* of the *Challenger* dredgings.

The genus *Balanocrinus* was established by the late Prof. Louis Agassiz for a crinoidal fragment that he believed to be a calyx with an attached stem-joint; and he described the terminal face of the latter as resembling those of the stem-joints of *Pentacrinus subteres*. Prof. de Loriol, however, finds this fragment to be merely an abnormally swollen piece of stem, with the borings of some parasitic mollusc. But the stem-joints of *P. subteres* have rather different terminal faces from those of the ordinary *Pentacrinus* species; and Prof. de Loriol therefore proposes to retain the name *Balanocrinus* for this and similar forms, in which only the rim of each joint-face is crenulated, and not the central ends of its petaloid divisions as in the ordinary *Pentacrinidae*. No calyx has ever been found associated with stem-joints of this nature except perhaps that of *P. Fisher*i. This name was given by Edward Forbes to a specimen from the Oxford clay of Weymouth that was described by Baily, who did not, however, say much about the stem-joints. Prof. de Loriol directs the attention of English palæontologists to this subject, in the hope of finding out whether Baily's species is a *Balanocrinus*. If it be so, the original specimen would acquire additional value from its being the only one with the calyx preserved.

The well-known genus *Eugeniocrinus*, which is made the type of a new family by Prof. de Loriol, is represented in the Swiss rocks by nine species, ranging from the "Oxfordien" to the "Néocomien." The curious form *Phyllocrinus* with its deeply incised radials was described by d'Orbigny as a Neocomian Blastoid allied to *Pentremites*; but it has become less interesting since Prof. Zittel showed it to be a near ally of *Eugeniocrinus*. It is represented in Switzerland by nine well-marked species, which range from the Lower Oolites to the Neocomian deposits.

Comatulæ are also abundant in the Swiss rocks, twelve species being described by Prof. de Loriol, eleven of

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which are new. These are equally distributed through the Jurassic and Cretaceous series; but there are none as old as our own *Actinometra Cheltonensis* from the Inferior Oolite of Gloucestershire, nor as young as various species from the Margate chalk. One of the Neocomian species belongs to the sub-genus *Ophiocrinus* of Semper, which is characterised by the presence of five undivided rays. There are only three recent species referable to this type, all of them inhabiting different portions of the Pacific Ocean. With the *Comatulæ* must be included two species of the curious genus *Thiolliericrinus*, recently mentioned in these columns (vol. xxiii. p. 377) as being a permanent larval form.

Prof. de Loriol's Monograph with its abundant illustrations forms an excellent supplement to the fourth volume of Quenstedt's wonderful "Petrefactenkunde Deutschlands," which deals with the *Encriniden*. Taken together, the two works give us a very complete account of the Mesozoic Crinoids of Central Europe. We understand that Prof. de Loriol is now working out the French Crinoids in the same way as he has treated the Swiss ones, and we hope that he will be enabled to complete this somewhat extensive task with an equally satisfactory result. This will render a similar work on the British Crinoids more than ever necessary, and we trust that it may be accomplished within a reasonable time.

The second book mentioned at the head of this article is the late Prof. Angelin's "Iconographia of the Silurian Crinoids of Sweden." It has been published as a posthumous work by the Swedish Academy, and is unquestionably the finest work on Crinoids that has ever appeared. It consists of twenty-nine beautifully-printed folio plates, which illustrate the marvellous wealth of Crinoids and Cystids in the Silurian rocks of Sweden. Some of the figures, such as those of *Crotalocrinus*, are excessively intricate, and they are all admirably clear and well-arranged. The lamented death of the eminent Swedish palæontologist has unfortunately prevented these figures from being as useful to his successors as they would have been, had he lived to describe them. They have been edited by two of his colleagues, Professors Lovén and Lindström, who have classified the genera and species according to the system which they found sketched out in Prof. Angelin's notes and manuscripts. Unfortunately, however, the classification is an entirely unnatural one, depending upon the number of basal plates in the calyx. Wachsmuth, the chief authority in America on the Palæocrinoids, has already pointed out that while it brings together very distinct types such as *Rhodocrinus* and *Poteriocrinus*, genera which are very intimately related, such as *Platycrinus* and *Dichocrinus*, are widely separated. Among the true Crinoids forty genera are figured, comprising 176 species, many of which are new. They are arranged into twenty-three families, but as these are not defined we are unable to learn the principles upon which they were established.

There are also figures of twenty-three Cystidean species, arranged into nine genera, including one new one, which fall into three sections, the *Apora*, *Gemellipora*, and *Rhombifera*. So far as can be judged from the species referred to each section, Angelin's classification is something more than an introduction of new names for the three divisions of the group which were sketched out by Müller. Neither

of the three genera included in the *Apora*, Angelin, are ordinarily referred to the *Aporitida*; but *Echinosphærites aurantium* and *Caryocystites*, von Buch, were placed by Müller among the *Rhombiferi* or "Cystideen mit Porenrauten"; while the third genus, *Megacystites*, Hall, is ordinarily referred to the *Diploporitida*, which is a parallel group to the *Gemellipora*, Angelin.

As in the case of the true Crinoids, we are unable to learn the principle of Angelin's classification of the Cystidea. It is not likely therefore to be adopted, at any rate for the present. Possibly, however, it may stand the test of future discoveries better than the Müllerian system, though we do not think this contingency a very probable one.

In spite of the inconsistencies which we have mentioned, the "Iconographia" must be indispensable to every student of the Palæocrinoidea. A glance through its pages makes one long to see some really good illustrations of our British species. There are many specimens of the utmost beauty and novelty, both in our public museums and in private collections, which we hope will some day be properly described in a "Monograph of the Fossil Crinoids of the British Isles."

OUR BOOK SHELF

The Countries of the World. By Robert Brown. Vol. vi. (London: Cassell and Co.)

WE are surprised that, after so many volumes of this work have been devoted to the description of America and Asia, the whole of Europe and of Africa are disposed of in a single volume, a considerable part of it being devoted, moreover, to the Turkish Empire. This last is allotted 58 pages, whilst the whole of Europe is dealt with in 104 pages, and the whole of Africa in other 104 pages. Moreover, why should Turkey have the favour of receiving thrice as much space as Russia, which is actually dismissed in only eight pages, whilst France, Germany, Italy, and Spain have only four pages each. Does the Russian Empire, or Spain, with their variety of climate, of soil, and of population, afford less interest for the general reader than Asiatic Turkey, and Italy less than Senegambia or Liberia?

It is obvious that such a distribution of space must affect the entire value of the work. Certainly when reading Mr. Brown's book we have admired in many instances the talent with which he succeeds in condensing in to very few pages a good description of a country; but the book being intended to afford more interest to the general reader than a simple text-book of geography, the author has been compelled to enter into generalisations which cannot but give a false idea of the subject. Is it possible that the reader can have a true conception of the climate of France when he learns from Mr. R. Brown's book that "the climate is one of the finest in Europe—mild, equable, and healthy, in spite of the hot winds from Africa, which sometimes impinge on the southern districts, and the chilly 'mistral' which sweeps down from the Alps in the north"? Or, what an idea will be impressed upon his mind of Paris, when he learns only that "in Paris centres the most polished society of the world. From Paris are sent forth the books, the bonnets, the pictures, and possibly even the vices which are so largely aped by the rest of the civilised world. It is the city of pleasure. But, contrary to the general impression, the morals of Paris, if not high, are not superlatively low; for though these are depraved enough, they are infinitely superior in many respects to those of Vienna, Naples, Bucharest, and even Berlin, which is more cir-